

§ 431.105

TEST PROCEDURES

§ 431.105 Materials incorporated by reference.

(a) *General.* DOE incorporates by reference the following test procedures into subpart G of part 431. The materials listed have been approved for incorporation by reference by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Any subsequent amendment to the listed materials by the standard-setting organization will not affect the DOE regulations unless and until such regulations are amended by DOE. Materials are incorporated as they exist on the date of the approval, and a notice of any change in the materials will be published in the FEDERAL REGISTER. All approved materials are available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202) 741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. Also, this material is available for inspection at U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, 6th Floor, 950 L'Enfant Plaza, SW., Washington, DC 20024, (202) 586-2945, or go to: http://www1.eere.energy.gov/buildings/appliance_standards. The referenced test procedure standards are listed below by relevant standard-setting organization, along with information on how to obtain copies from those sources.

(b) *ANSI.* American National Standards Institute, 25 W. 43rd Street, 4th

10 CFR Ch. II (1–1–14 Edition)

Floor, New York, NY 10036, (212) 642-4900, or go to: <http://www.ansi.org>.

(1) ANSI Z21.10.3-1998 (“ANSI Z21.10.3-1998”), “*Gas Water Heaters, Volume III, Storage Water Heaters With Input Ratings Above 75,000 Btu Per Hour, Circulating and Instantaneous*, Z21.10.3-1998, CSA 4.3-M98, and its Addenda, ANSI Z21.10.3a-2000, CSA 4.3a-M00,” approved by ANSI on October 18, 1999, IBR approved for § 431.106.

(2) ANSI Z21.10.3-2011 (“ANSI Z21.10.3-2011”), “*Gas Water Heaters, Volume III, Storage Water Heaters With Input Ratings Above 75,000 Btu Per Hour, Circulating and Instantaneous*,” approved on March 7, 2011, IBR approved for § 431.106.

(3) [Reserved]

[77 FR 28996, May 16, 2012]

§ 431.106 Uniform test method for the measurement of energy efficiency of commercial water heaters and hot water supply boilers (other than commercial heat pump water heaters).

(a) *Scope.* This section covers the test procedures you must follow if, pursuant to EPCA, you are measuring the thermal efficiency or standby loss, or both, of a storage or instantaneous water heater or hot water supply boiler (other than a commercial heat pump water heater).

(b) *Testing and Calculations.* Determine the energy efficiency of each covered product by conducting the test procedure(s), set forth in the two rightmost columns of the following table, that apply to the energy efficiency descriptor(s) for that product:

Department of Energy

§ 431.106

TABLE 1 TO § 431.106—TEST PROCEDURES FOR COMMERCIAL WATER HEATERS AND HOT WATER
SUPPLY BOILERS

[Other than commercial heat pump water heaters]

Equipment type	Energy efficiency descriptor	Use test setup, equipment and procedures in subsection labeled "Method of Test" of	Test procedure required for compliance until	With these additional stipulations
Gas-fired Storage and Instantaneous Water Heaters and Hot Water Supply Boilers*.	Thermal Efficiency Standby Loss	ANSI Z21.10.3–1998 **, § 2.9. ANSI Z21.10.3–1998 **, § 2.10.	May 13, 2013 May 13, 2013	<p>A. For all products, the duration of the standby loss test shall be until whichever of the following occurs first after you begin to measure the fuel and/or electric consumption: (1) The first cutout after 24 hours or (2) 48 hours, if the water heater is not in the heating mode at that time.</p> <p>B. For oil and gas products, the standby loss in Btu per hour must be calculated as follows: $SL \text{ (Btu per hour)} = S \text{ (\% per hour)} \times 8.25 \text{ (Btu/gal-F)} \times \text{Measured Volume (gal)} \times 70 \text{ (degrees F)}.$</p> <p>C. For oil-fired products, apply the following in conducting the thermal efficiency and standby loss tests: (1) Venting Requirements—Connect a vertical length of flue pipe to the flue gas outlet of sufficient height so as to meet the minimum draft specified by the manufacturer. (2) Oil Supply—Adjust the burner rate so that: (a) The hourly Btu input rate lies within ± 2 percent of the manufacturer's specified input rate, (b) the CO₂ reading shows the value specified by the manufacturer, (c) smoke in the flue does not exceed No. 1 smoke as measured by the procedure in ASTM–D–2156–80, and (d) fuel pump pressure lies within ± 10 percent of manufacturer's specifications.</p>

§ 431.106

10 CFR Ch. II (1–14 Edition)

TABLE 1 TO § 431.106—TEST PROCEDURES FOR COMMERCIAL WATER HEATERS AND HOT WATER SUPPLY BOILERS—Continued
[Other than commercial heat pump water heaters]

Equipment type	Energy efficiency descriptor	Use test setup, equipment and procedures in subsection labeled "Method of Test" of	Test procedure required for compliance until	With these additional stipulations
				<p>D. For electric products, apply the following in conducting the standby loss test: (1) Assume that the thermal efficiency (Et) of electric water heaters with immersed heating elements is 98 percent. (2) Maintain the electrical supply voltage to within ± 5 percent of the center of the voltage range specified on the water heater nameplate. (3) If the set up includes multiple adjustable thermostats, set the highest one first to yield a maximum water temperature in the specified range as measured by the topmost tank thermocouple. Then set the lower thermostat(s) to yield a maximum mean tank temperature within the specified range.</p> <p>E. Install water-tube water heaters as shown in Figure 2, "Arrangement for Testing Water-tube Type Instantaneous and Circulating Water Heaters."</p>

* As to hot water supply boilers with a capacity of less than 10 gallons, these test methods become mandatory on October 21, 2005. Prior to that time, you may use for these products either (1) these test methods if you rate the product for thermal efficiency, or (2) the test methods in Subpart E if you rate the product for combustion efficiency as a commercial packaged boiler.

** Incorporated by reference, see § 431.105.

Department of Energy

§ 431.106

TABLE 2 TO § 431.106—TEST PROCEDURES FOR COMMERCIAL WATER HEATERS AND HOT WATER SUPPLY BOILERS

[Other than commercial heat pump water heaters]

Equipment type	Energy efficiency descriptor	Use test setup, equipment and procedures in sub-section labeled "Method of Test" of	Test procedure required for compliance on and after	With these additional stipulations
Gas-fired Storage and Instantaneous Water Heaters and Hot Water Supply Boilers*. Oil-fired Storage and Instantaneous Water Heaters and Hot Water Supply Boilers*. Electric Storage and Instantaneous Water Heaters.	Thermal Efficiency Standby Loss Thermal Efficiency Standby Loss Standby Loss	ANSI Z21.10.3–2011 **, Exhibit G1. ANSI Z21.10.3–2011 **, Exhibit G2. ANSI Z21.10.3–2011 **, Exhibit G1. ANSI Z21.10.3–2011 **, Exhibit G2. ANSI Z21.10.3–2011 **, Exhibit G2.	May 13, 2013 May 13, 2013 May 13, 2013 May 13, 2013 May 13, 2013	A. For all products, the duration of the standby loss test shall be until whichever of the following occurs first after you begin to measure the fuel and/or electric consumption: (1) The first cutout after 24 hours or (2) 48 hours, if the water heater is not in the heating mode at that time. B. For oil and gas products, the standby loss in Btu per hour must be calculated as follows: $SL \text{ (Btu per hour)} = S \text{ (\% per hour)} \times 8.25 \text{ (Btu/gal-F)} \times \text{Measured Volume (gal)} \times 70 \text{ (degrees F)}$. C. For oil-fired products, apply the following in conducting the thermal efficiency and standby loss tests: (1) Venting Requirements—Connect a vertical length of flue pipe to the flue gas outlet of sufficient height so as to meet the minimum draft specified by the manufacturer. (2) Oil Supply—Adjust the burner rate so that: (a) The hourly Btu input rate lies within ± 2 percent of the manufacturer's specified input rate, (b) the CO ₂ reading shows the value specified by the manufacturer, (c) smoke in the flue does not exceed No. 1 smoke as measured by the procedure in ASTM–D–2156–80, and (d) fuel pump pressure lies within ± 10 percent of manufacturer's specifications.

TABLE 2 TO § 431.106—TEST PROCEDURES FOR COMMERCIAL WATER HEATERS AND HOT WATER
SUPPLY BOILERS—Continued
[Other than commercial heat pump water heaters]

Equipment type	Energy efficiency descriptor	Use test setup, equipment and procedures in subsection labeled “Method of Test” of	Test procedure required for compliance on and after	With these additional stipulations
				<p>D. For electric products, apply the following in conducting the standby loss test: (1) Assume that the thermal efficiency (Et) of electric water heaters with immersed heating elements is 98 percent. (2) Maintain the electrical supply voltage to within ± 5 percent of the center of the voltage range specified on the water heater nameplate. (3) If the set up includes multiple adjustable thermostats, set the highest one first to yield a maximum water temperature in the specified range as measured by the topmost tank thermocouple. Then set the lower thermostat(s) to yield a maximum mean tank temperature within the specified range.</p> <p>E. Install water-tube water heaters as shown in Figure 2, “Arrangement for Testing Water-tube Type Instantaneous and Circulating Water Heaters.”</p>

* As to hot water supply boilers with a capacity of less than 10 gallons, these test methods become mandatory on October 21, 2005. Prior to that time, you may use for these products either (1) these test methods if you rate the product for thermal efficiency, or (2) the test methods in Subpart E if you rate the product for combustion efficiency as a commercial packaged boiler.

** Incorporated by reference, see § 431.105.

[77 FR 28996, May 16, 2012]

§ 431.107 Uniform test method for the measurement of energy efficiency of commercial heat pump water heaters. [Reserved]

ENERGY CONSERVATION STANDARDS

§ 431.110 Energy conservation standards and their effective dates.

Each commercial storage water heater, instantaneous water heater, unfired hot water storage tank and hot water supply boiler¹ must meet the applicable energy conservation standard level(s) as follows:

¹ Any packaged boiler that provides service water, that meets the definition of “commercial packaged boiler” in subpart E of this part, but does not meet the definition of “hot water supply boiler” in subpart G, must meet the requirements that apply to it under subpart E.